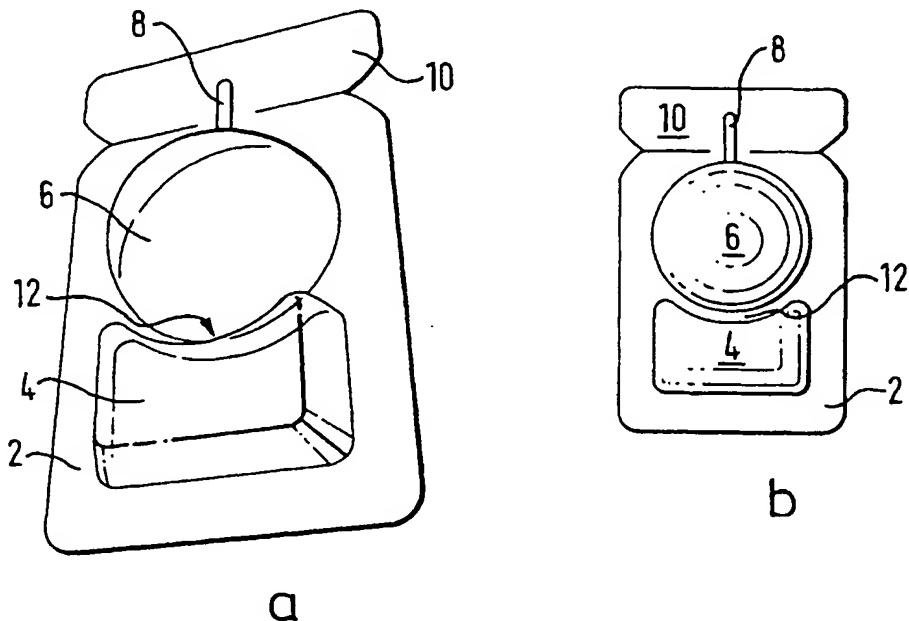




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(54) Title: PACK



(57) Abstract

A pack for an epoxy resin and a hardener comprises a thermoforming (2) with two adjacent compartments (4, 6) for the epoxy resin and the hardener respectively. A laminated sheet is bonded to the underside of the thermoforming (2) to close each compartment (4, 6). A rupturable portion (12) between the two compartments at the interface of the thermoforming (2) and the laminate ruptures when external pressure is applied to one of the compartments (4, 6). The rupturing brings the two compartments (4, 6) into communication and allows the epoxy resin and the hardener to be mixed within an enclosed envelope. The mixed adhesive can be dispensed through a nozzle formed by a break-off duct (8) which is in communication with one of the compartments (4, 6).

Pack

5 The present invention relates to a pack for, and a method of packaging, a two-component product, such as an adhesive formed from an epoxy resin and a hardener.

10 Traditionally, epoxy adhesives have been sold with the resin and the hardener packaged in separate tubes, so that the resin and the hardener do not react before the product is to be used. The user dispenses equal amounts of the resin and hardener from the respective tubes and mixes the two components with an appropriate implement to form the adhesive. The mixing process is often messy and requires the provision of a mixing implement and mixing surface or container by the user.

15 A pack for a two-component product, primarily a pharmaceutical product, has been proposed in GB-A-2002316. This pack comprises two stacked compartments for the respective products separated by a barrier layer which can be ruptured by an internal projection when it is desired to mix the components. Mixing of the components is carried out by the user shaking or kneading the pack. It is apparent that the compartments of the pack of GB-A-2002316 cannot both be filled in a single operation, which leads to a complex assembly process for this type of pack.

20 EP-A-612673 and EP-A-688726 each disclose packs for a multi-component product in the form of a bag composed of bonded plastics sheets. The arrangement of the sheets divides the interior of the bag into compartments for respective components of the product. Perforations are provided in the sheets separating two compartments, which perforations are ruptured when it is desired to mix the components. Mixing of the components is achieved by the user kneading the bag. This type of pack requires a complex filling process, as the

compartments for the components are only formed when the sheets have been bonded together.

Viewed from a first aspect, the invention provides a pack for a two-component product, such as for example an adhesive formed from an epoxy resin and a hardener, the pack comprising an enclosure member having defined therein two adjacent compartments for respective components of the product, and a substantially planar base member bonded to the enclosure member so as to close each compartment, wherein a rupturable portion is provided between the two compartments at the interface of the enclosure member and the base member, and wherein the rupturable portion is arranged to be ruptured, in use, to bring the two compartments into communication and allow the components of the product to be mixed within an envelope formed by the communicating compartments.

Thus, the invention provides a pack in which the two components of the product are separated during storage, but can be mixed, for example by kneading, without opening the pack. This prevents the need for the user to provide a mixing implement and/or mixing surface or container and reduces the messiness of the mixing operation. Furthermore, it is possible for the mixed product to be dispensed straight from the pack.

Moreover, the pack according to the invention is of a particularly convenient design in that it is possible for the compartments in the enclosure member, which may be in the form of recesses, wells or blisters, to be filled in one operation and then closed by bonding the base member to the enclosure member. This allows for greater flexibility in the packaging process than has previously been available.

Viewed from a further aspect, therefore, the invention provides a method of packaging a two-component product, the method comprising:

providing an enclosure member having defined

therein two compartments;

filling each of said compartments with a respective component of the product;

5 bonding a substantially planar base member to the enclosure member so as to close each filled compartment; and

10 providing a rupturable portion between the two compartments at the interface of the enclosure member and the base member, which rupturable portion is arranged to be ruptured, in use, to bring the two compartments into communication and allow the components of the product to be mixed within an envelope formed by the communicating compartments.

15 Thus the base member may conveniently provide a lid for the two compartments after filling.

20 The rupturable portion may be in the form of a rupturable bonded region between the compartments, for example, a relatively narrow region. The rupture of the bond can provide a path between the adjacent compartments, there being no need to provide perforations or breakage regions in the material of the enclosure member or that of the base member. This simplifies manufacture. Desirably, the rupturable portion is rupturable by external pressure applied to 25 either one of the compartments by the finger and thumb of a user, and this may determine the dimensions of such a bonded region.

30 The rupturable portion may be in the form of a weakened or weaker bond between the enclosure member and the base member. In a preferred embodiment a sealing bond will be formed by the base member all the way round its interface with each compartment, with a weakened area between the two compartments providing the rupturable portion. In one arrangement, the rupturable 35 portion is provided with an interference layer, such as latex based ink applied to the appropriate portion of the enclosure member or the base member, at the

interface of the base member and the enclosure member.

5 The enclosure member may be relatively rigid, at least in part, although it is desirable for the portions of the enclosure member defining the compartments to be relatively flexible so that the components can be manually manipulated during mixing. Indeed, the entire enclosure member may be made from a relatively flexible material.

10 The enclosure member may be in any suitable form. In general, the enclosure member is made of moulded plastics. In a preferred arrangement, the enclosure member is in the form of a thermoplastic, for example polypropylene, forming, such as a vacuum forming.

15 The base member may be relatively rigid or relatively flexible. For example, if it is desired for the pack to be relatively rigid, the rigidity may be provided by the enclosure member, the base member or both.

20 The base member may be made from any suitable material, for example plastics. In one arrangement, the base member is made of a laminate, for example in the form of a metallised plastics foil.

25 A plurality of packs sharing a common base member may be provided. Such a plural pack unit may include packs with differently sized compartments or packs with different fill volumes or packs for different products, e.g. different cure time adhesives.

30 The material of the base member and/or the enclosure member may be provided from a continuous supply, for example a reel, of material. In this way, packs according to the invention may be made on a continuous production line. A plurality of packs may be made, and optionally filled, simultaneously. The resulting plural pack unit may be in strip form. The manufacturing or filling process may include the forming 35 of the compartments in the enclosure member.

The enclosure member and the base member may be

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bonded to each other in any suitable manner, for example by thermal or ultrasonic welding or by the use of an adhesive.

5 The pack may be opened to release the mixed product by puncturing or cutting the envelope formed by the communicating compartments. Preferably, however an outlet or nozzle is provided through which the product may exit the pack. The nozzle may be provided with a closure. The closure may be re-usable, for example in 10 the form of a cap. However, in the case of a product such as an epoxy adhesive, the product must be used shortly after the components have been mixed, and thus a re-usable closure is not required.

15 In one arrangement, a blind duct is provided, for example as part of the enclosure member, in communication with one of the compartments. The closed end of the duct may be cut, twisted, broken or otherwise separated from the pack to provide an outlet, e.g. a nozzle, from which the mixed product may be dispensed. 20 Preferably, the duct has a weakened portion to aid the removal of the end of the duct. Advantageously, the duct is connected to an extended portion of the pack which the user may grip when removing the end of the duct and which may be removed with the duct.

25 A preferred embodiment of the invention will now be described by way of example only and with reference to the accompanying figures, in which:

30 Figure 1a shows a perspective view and figure 1b shows a plan view of a pack according to an embodiment of the invention;

Figures 2a to 2c illustrate the operation of the pack of figure 1; and

Figure 3 shows the pack of figure 1 in use.

35 With reference to figures 1a and 1b, a pack for an epoxy adhesive and a hardener comprises an enclosure member in the form of a polypropylene vacuum thermoforming 2. The thermoforming 2 includes two

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depressions each defining a compartment 4,6 for the epoxy adhesive and the hardener respectively. A part of the thermoforming 2 is in the form of a blind duct 8 extending from the compartment 6 and in communication therewith. A twist-off panel 10 extends from either side of the duct 8 and enables the end of the duct 8 to be twisted from the thermoforming 2, so that the contents of compartment 6 can exit through the nozzle formed by the residual portion of the duct 8. The compartments 4,6, duct 8 and twist-off panel are all formed integrally as parts of the thermoforming 2.

On the underside of the pack as shown in figures 1a and 1b, a base member in the form of a sheet of metallised polypropylene laminate corresponding in size and shape to the outline of the thermoforming 2 is bonded to the lower surface of the thermoforming 2. The laminate closes off and seals the compartments 4,6. Between the positions of the compartments 4,6 on the laminate an interference coating of latex based ink is provided which interferes with the bond between the thermoforming 2 and the laminate to provide a rupturable portion 12.

To produce the pack, the epoxy adhesive and the hardener are deposited in their respective compartments 4,6 in the thermoforming 2. The laminate, which has the interference coating printed thereon, is then bonded to the thermoforming to close the compartments, i.e. to form a lid.

The operation of the pack of figure 1 will now be described with reference to figures 2a to 2c.

As shown in figure 2a, when it is desired to mix the epoxy adhesive and the hardener, the user applies pressure with finger and thumb to compartment 4. The increased pressure in compartment 4 acts to force its contents towards compartment 6 against the rupturable region 12. Under this pressure, the bond between the thermoforming 2 and the laminate breaks at the

rupturable portion 12. This allows the compartments 4,6 to communicate and effectively form a single compartment or envelope. As shown in figure 2a, the contents of compartment 4 can then be forced into compartment 6 in 5 the direction of the arrow. As shown in figures 2b and 2c, the user is now able to manually manipulate the epoxy adhesive and hardener, squeezing them repeatedly from one compartment to the other. This manipulation mixes the epoxy adhesive with the hardener to form the 10 desired product. It should be noted that the mixing operation is carried out while the epoxy adhesive and hardener are still completely contained within the pack.

Once the product is thoroughly mixed, the twist-off panel 10 is rotated to break off the end of the duct 8, 15 so that the residual portion of the duct 8 forms a dispensing nozzle. The mixed adhesive can then be dispensed through the nozzle/duct 8 by applying pressure to the envelope formed by the communicating compartments 4,6. This is shown in figure 3.

20 Although the invention has been described herein with particular reference to epoxy adhesives, it will be appreciated that the invention may be applied to other two-component products, such as pharmaceutical preparations, toothpastes and the like. Furthermore, 25 the invention is also of application to products comprising more than two components, with a compartment being provided for each component. Moreover, the invention may be applied to products wherein not all components are in a fluid phase, for example products comprising a liquid component and a solid component, two solid components or even one or more gaseous components.

Claims:

1. A pack for a two-component product, the pack comprising an enclosure member having defined therein two adjacent compartments for respective components of the product, and a substantially planar base member bonded to the enclosure member so as to close each compartment, wherein a rupturable portion is provided between the two compartments at the interface of the enclosure member and the base member, and wherein the rupturable portion is arranged to be ruptured, in use, to bring the two compartments into communication and allow the components of the product to be mixed within an envelope formed by the communicating compartments.
- 15 2. A pack as claimed in claim 1, wherein the rupturable portion is in the form of a rupturable bonded region between the compartments.
- 20 3. A pack as claimed in claim 1 or 2, wherein the rupturable portion is provided with an interference layer at the interface of the base member and the enclosure member.
- 25 4. A pack as claimed in any preceding claim, wherein the enclosure member is in the form of a thermoplastic forming.
- 30 5. A pack as claimed in any preceding claim, comprising a blind duct in communication with one of the compartments, part of the blind duct being separable from the pack to provide an outlet from which the mixed product may be dispersed.
- 35 6. A method of packaging a two-component product, the method comprising:
providing an enclosure member having defined

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therein two compartments;

filling each of said compartments with a respective component of the product;

5 bonding a substantially planar base member to the enclosure member so as to close each filled compartment; and

10 providing a rupturable portion between the two compartments at the interface of the enclosure member and the base member, which rupturable portion is arranged to be ruptured, in use, to bring the two compartments into communication and allow the components of the product to be mixed within an envelope formed by the communicating compartments.

15 7. A method as claimed in claim 6, wherein an interference layer is applied at the interface of the enclosure member and the base member to form the rupturable portion between the two compartments.

20 8. A pack for a two-component product, substantially as hereinbefore described with reference to the accompanying drawings.

25 9. A method of packaging a two-component product, substantially as hereinbefore described with reference to the accompanying drawings.

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
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(71) Applicant (for all designated States except US): VANTICO AG [CH/CH]: Klybeckstrasse 200, CH-4057 Basel (CH).

(72) Inventors; and (73) Inventors/Applicants (for US only): TYLDESLEY, Frank [GB/GB]; 2 Common Farm Cottage, High Common, North Lopham, Diss, Norfolk IP22 2HS (GB). BARNARDO, Christopher, John, Andrew [GB/GB]; 42 Grange Road, Bishops Stortford, Hertfordshire CM23 5NQ (GB).

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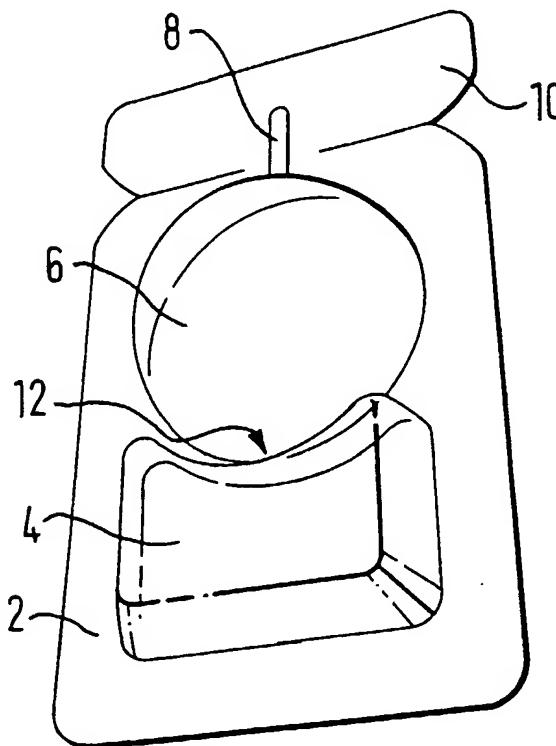
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[Continued on next page]

(54) Title: PACK FOR TWO-COMPONENT PRODUCT AND METHOD OF MAKING IT



WO 00/009416 A3



(57) Abstract: A pack for an epoxy resin and a hardener comprises a thermoforming (2) with two adjacent compartments (4, 6) for the epoxy resin and the hardener respectively. A laminated sheet is bonded to the underside of the thermoforming (2) to close each compartment (4, 6). A rupturable portion (12) between the two compartments at the interface of the thermoforming (2) and the laminate ruptures when external pressure is applied to one of the compartments (4, 6). The rupturing brings the two compartments (4, 6) into communication and allows the epoxy resin and the hardener to be mixed within an enclosed envelope. The mixed adhesive can be dispensed through a nozzle formed by a break-off duct (8) which is in communication with one of the compartments (4, 6).

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02582

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D81/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65D A61J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category ^o	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 93 10019 A (FARMER HARLEY) 27 May 1993 (1993-05-27) page 3, last paragraph -page 4, paragraph 1; figure ---	1,2,6
X	US 5 215 221 A (DIRKSING ROBERT S) 1 June 1993 (1993-06-01) column 2, line 27 - line 57; figures 1-4 ---	1,2,4,5
X	WO 82 02700 A (FIRMENICH & CIE ;HOLZNER GUENTER (CH)) 19 August 1982 (1982-08-19) page 3, line 31 -page 4, line 5 page 5, line 6 - line 14; figures 2,3 -----	1-3,6,7

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

4 November 1999

Date of mailing of the international search report

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Name and mailing address of the ISA

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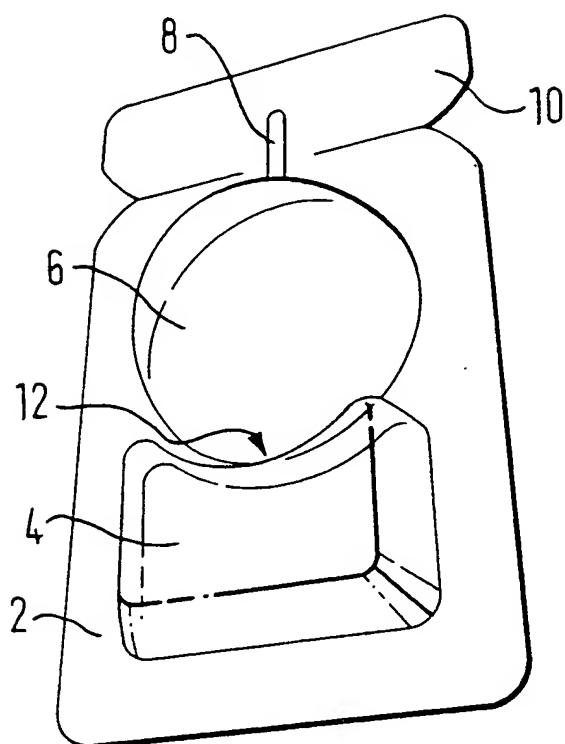


FIG. 1a

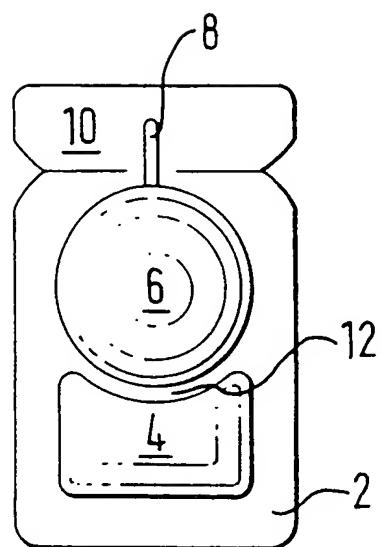


FIG. 1b

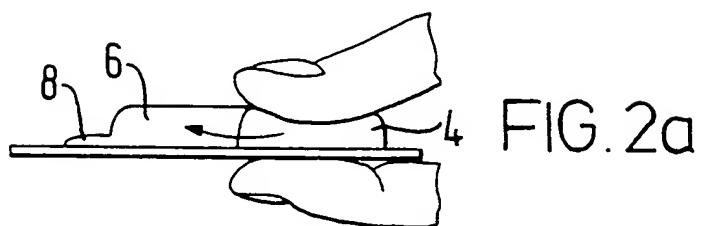


FIG. 2a

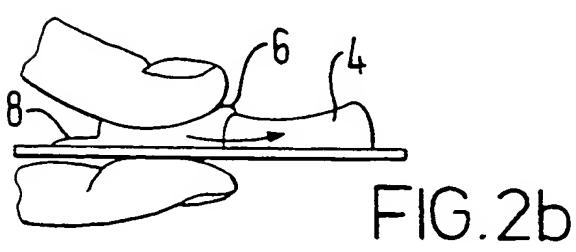


FIG. 2b

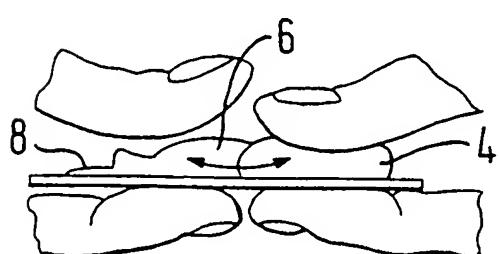


FIG. 2c

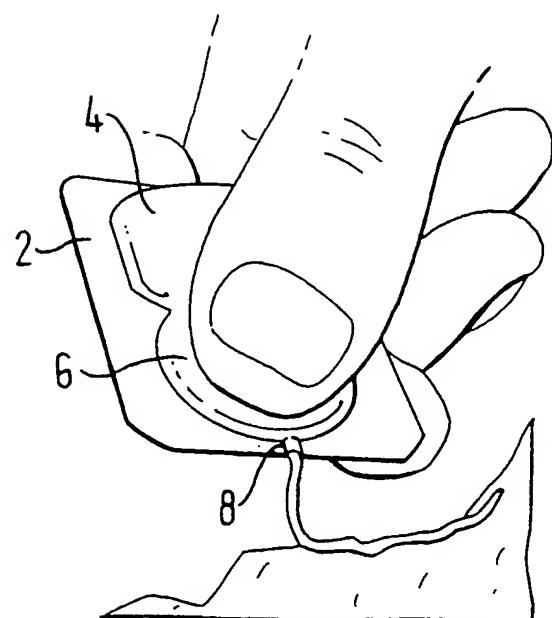


FIG. 3

INTERNATIONAL SEARCH REPORT

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)			Publication date
WO 9310019	A 27-05-1993	AU 2908592	A	15-06-1993	
		GB 2275246	A, B	24-08-1994	
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**(88) Date of publication of the international search report:**

27 December 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 99/02582

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: 8, 9 because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
Claims 8 and 9 do not comply with Rule 6.2a)PCT.

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.